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Data From the Deep-Rock Samples on File From Wells Drilled in Nebraska

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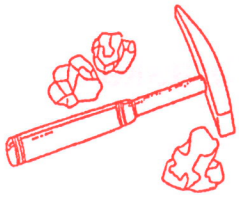
Nebraska Geological Survey



INFORMATION

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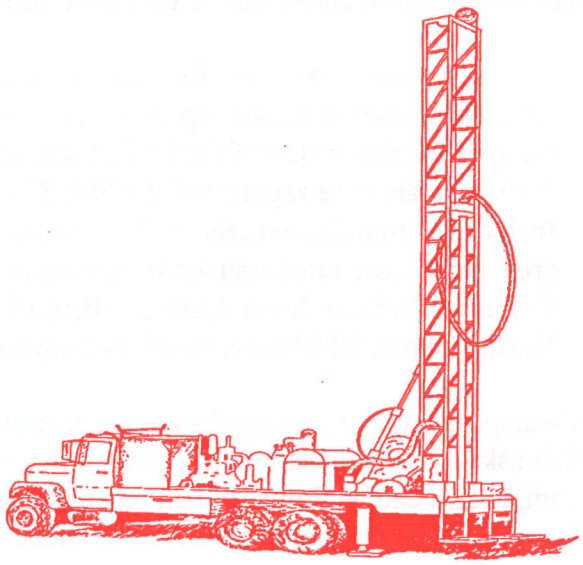


July 1995

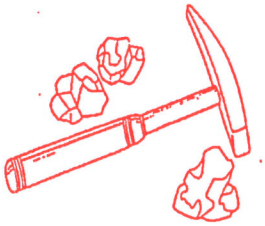
Institute of Agriculture and Natural Resources
University of Nebraska-Lincoln

DATA FROM THE DEEP
Rock Samples on file from wells drilled in Nebraska

Duane R. Mohlman
Data Systems Coordinator, CSD

As of July 1995, the Conservation and Survey Division (CSD) Sample Library houses samples from approximately 14,824 holes drilled within Nebraska. Besides samples from the division's own test-hole drilling program (*NGS Information Sheet Number 11* summarizes CSD's test drilling program), samples are routinely received from commercial drillers for water, oil and gas, and minerals, and from the Nebraska Department of Roads, the US Army Corps of Engineers and the US Bureau of Reclamation. Nebraska State Statutes (Sec. 85-163 (6) defines one of the Division's duties as "Secure and preserve the logs of wells drilled in the state, and preserve specimans from each stratum, member, or formation penetrated in said drillings, and inspect such drillings at any time during their progress, and require the person or persons in charge of drilling or prospecting to submit full data in regard to the specimans and logs of the wells."

The samples are of two types: rotary cuttings and core segments. Rotary cuttings are loosened or fractured by the drill bit and then flushed to the surface. Core segments require use of special bits that cut vertical cylinders from buried rocks, then lift those cylinders to the surface.

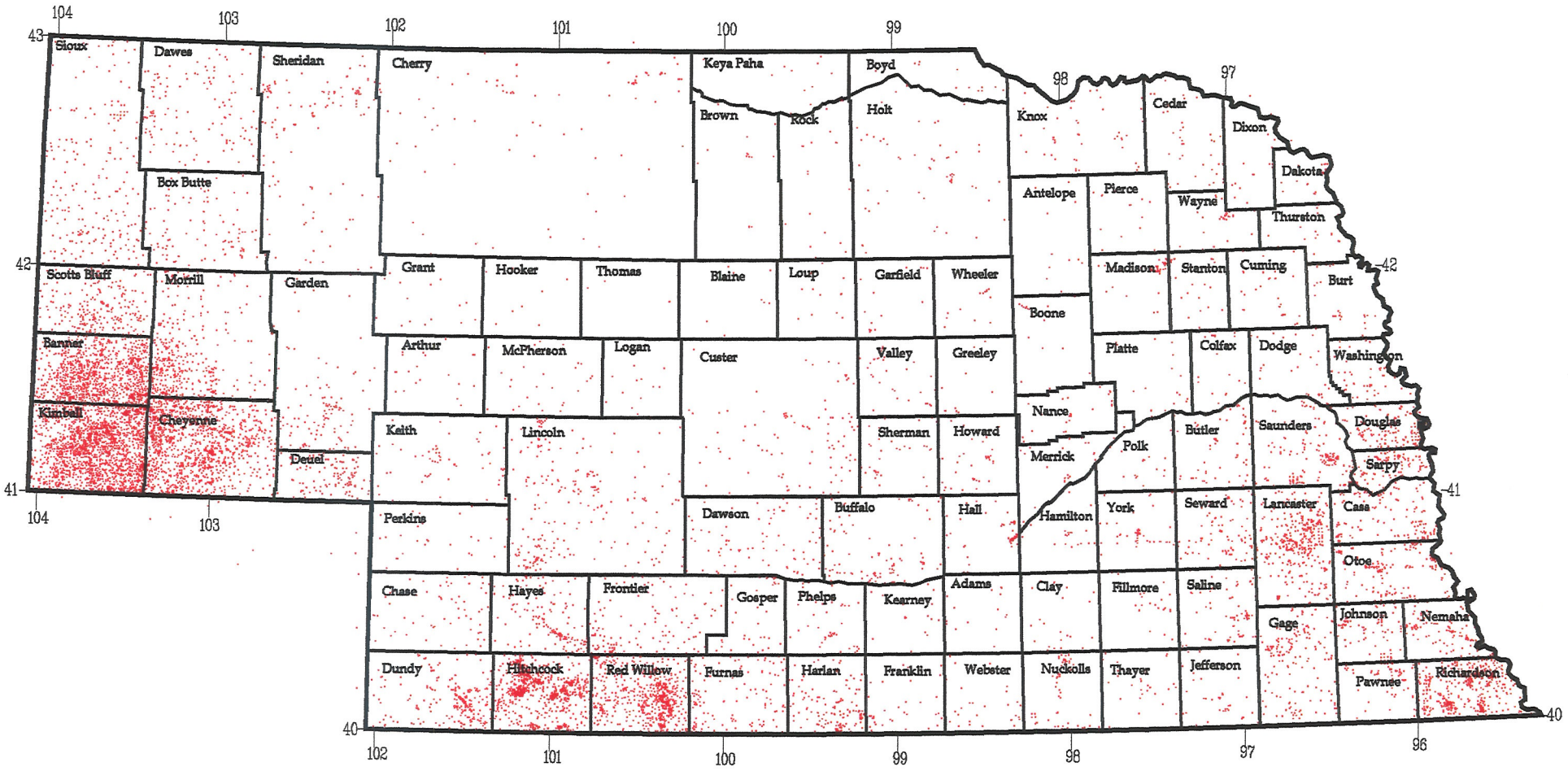


A "set-of-samples" for an individual well consists of a variable number of boxes depending on the amount and type of rock samples for that well. Of the 14,824 sets-of-samples CSD has, 2,201 contain core segments (of which 353 are entirely core). Included within these totals are 224 sample sets (of which 33 either are entirely core or contain core segments) from 11 other states--Colorado, Indiana, Iowa, Kansas, Missouri, Montana, New Mexico, North Dakota, Oklahoma, South Dakota and Wyoming.

CSD has three sets-of-samples extending to depths greater than 9,000 feet--all from Kimball County in western Nebraska. The deepest hole was drilled to a depth of 9,350 feet. Approximately 1,350 of the sample sets extend down to the Precambrian surface meaning that a complete representation of the younger sedimentary rocks is represented.

CSD receives hundreds of sample sets each year. Samples arrive in many forms and containers and frequently are still wet from drilling. A critical first step is to obtain an accurate location for the test-hole. Then the samples are "cut"--that is, a representative portion of each sample is placed in an appropriate container and is clearly labeled, cataloged, and entered in the sample data base.

Rock Samples Database



0 10 20 30 40 50 60 Miles

0 10 20 30 40 50 60 Kilometers

Map prepared by Jim Weir, CSD-UNL, 1998

University of Nebraska Lincoln

SAMPLES BY COUNTY (& STATE)

COUNTY NAME	CTY NO	SAMPLE SETS CUTT	CORE
ADAMS	001	0018	001
ANTELOPE	002	0013	000
ARTHUR	003	0026	001
BANNER	004	1118	321
BLAINE	005	0010	001
BOONE	006	0017	000
BOX BUTTE	007	0125	012
BOYD	008	0016	004
BROWN	009	0014	001
BUFFALO	010	0099	002
BURT	011	0028	000
BUTLER	012	0071	007
CASS	013	0201	006
CEDAR	014	0045	003
CHASE	015	0072	004
CHERRY	016	0113	002
CHEYENNE	017	1421	389
CLAY	018	0021	000
COLFAX	019	0024	000
CUMING	020	0044	001
CUSTER	021	0100	001
DAKOTA	022	0040	000
DAWES	023	0136	011
DAWSON	024	0092	002
DEUEL	025	0145	012
DIXON	026	0017	000
DODGE	027	0069	000
DOUGLAS	028	0271	012
DUNDY	029	0277	007
FILLMORE	030	0026	000
FRANKLIN	031	0036	002
FRONTIER	032	0142	004
FURNAS	033	0149	004
GAGE	034	0210	002
GARDEN	035	0120	016
GARFIELD	036	0019	000
GOSPER	037	0043	000
GRANT	038	0017	001
GREELEY	039	0012	000
HALL	040	0081	000
HAMILTON	041	0022	000
HARLAN	042	0193	007
HAYES	043	0162	007
HITCHCOCK	044	0926	003
HOLT	045	069	001
HOOKER	046	0010	001
HOWARD	047	0038	000
JEFFERSON	048	0044	000
JOHNSON	049	0166	077
KEARNEY	050	0050	000
KEITH	051	0081	004
KEYA PAHA	052	0016	001
KIMBALL	053	2014	602
KNOX	054	0056	001
LANCASTER	055	0527	000
LINCOLN	056	0254	005
LOGAN	057	0014	000
LOUP	058	0012	005
MADISON	059	0071	000
MCPHERSON	060	0029	000
MERRICK	061	0027	000
MORRILL	062	0415	071
NANCE	063	0031	000
NEMAHA	064	0141	005
NUCKOLLS	065	0075	002
OTOE	066	0326	005
PAWNEE	067	0110	024
PERKINS	068	0030	004
PHELPS	069	0047	000
PIERCE	070	0014	000
PLATTE	071	0022	000
POLK	072	0023	000
RED WILLOW	073	0739	021
RICHARDSON	074	0624	179
ROCK	075	0029	006
SALINE	076	0100	000
SARPY	077	0192	003
SAUNDERS	078	0256	008
SCOTTS BLUFF	079	0284	041
SEWARD	080	0129	001
SHERIDAN	081	0149	009
SHERMAN	082	0043	002
SIOUX	083	0234	032
STANTON	084	0027	001
THAYER	085	0028	000
THOMAS	086	0003	000
THURSTON	087	0026	000
VALLEY	088	0033	028
WASHINGTON	089	0057	001
WAYNE	090	0036	000
WEBSTER	091	0029	002
WHEELER	092	0014	000
YORK	093	0055	000
OTHER STATES:			
COLORADO	099	0071	009
INDIANA	107	0001	000
IOWA	108	0033	017
KANSAS	109	0074	004
MISSOURI	118	0007	001
MONTANA	119	0001	000
NEW MEXICO	123	0001	000
NORTH DAKOTA	126	0001	000
OKLAHOMA	128	0005	000
SOUTH DAKOTA	133	0023	002
WYOMING	142	0007	000
TOTALS:		**14,824**	**2,021**

The space requirements are enormous for such a large sample facility. CSD is now using three locations in and outside Lincoln to house the samples. The main location is at the CSD offices, or "sample headquarters." Here, CSD keeps its samples from its test-hole drilling program, samples currently used by division researchers, and most of the samples received from the oil industry. At the nearby Geo-resources Building, north of Nebraska Hall, samples are kept for special projects. (For example, samples were stored and studied here from holes that were drilled during the recent search for a new Lincoln landfill.) Finally, at the UNL Agricultural Research and Development Center at Mead, Nebraska, is the largest of CSD's sample-storage areas. This facility contains samples from completed projects, oil and gas samples, some duplicate samples, as well as samples from the federal drilling programs. Duplicate samples are valuable since they are expendable for research and testing.

Why keep such an enormous supply of samples? The reasons are as varied and numerous as the individuals and companies who use the Sample Library. Some of the primary reasons include:

- CSD is mandated by state law to provide housing for the samples.
- Considerable expenditures can be saved by not drilling duplicate wells for a new project.
- Duplicate samples can be used for research purposes.
- Reliable estimates can be made of the depth and nature of various geologic units for mineral exploration, groundwater studies, and foundation plans.

The Sample Library receives most of its use from CSD staff. However, over the years, countless individuals and companies have profited from the wealth of information housed in the library. Graduate students working on theses and dissertations have often studied CSD samples. Researchers and consultants from all areas, scientists from the oil industry and the Natural Resources Conservation Service (formally Soil Conservation Service), engineers from the Nebraska Department of Roads, and numerous other government agencies have all utilized CSD's Sample Library.

Most of the samples, and all their related interpretations and information produced by CSD staff are available for inspection by any interested party. However, some samples are kept confidential for stated periods of time to protect, for example, company interests during oil or mineral deposit development.

An automated database of the samples was recently completed. The database contains the following items (and can be queried on one or any combination of these items): legal description, county, landowner when the sample was taken, operator, number of sample boxes, depths of the samples, source of cut, date sample was filed, well type, types of samples (cuttings, core, or both) and the CSD storage location.

The enclosed chart and map illustrate by county (and other states) the number of samples, including how many contain core segments, that CSD has on file.

For further information about CSD's samples, or a free publications catalog, contact:

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